

LISTING OF CLAIMS

This listing of claims will replace all prior versions and listings of claims in the application:

Claim 1 (Currently Amended): A digital camera for acquiring image data by acquiring a subject image, comprising:

an imaging device configured to acquire said subject image;

a piezoelectric element configured to displace said imaging device;

a detecting circuit configured to detect a representative voltage indicative of a level of voltage presently being applied to the piezoelectric element;

a comparing unit configured to compare a reference voltage corresponding to a predetermined amount of displacement of the imaging device with ~~[[a]]~~ the representative piezoelectric element voltage detected by the detecting circuit and to provide an output indicating that the representative piezoelectric element voltage detected by the detecting circuit is less than the reference voltage;

a charging unit including at least one energy accumulating unit configured to power a strobe unit; and

a control element configured to supply electricity from the energy accumulating unit of the charging unit to the piezoelectric element to raise said level of voltage presently being applied to the piezoelectric element ~~voltage~~ responsive to the comparing unit providing the output indicating that the ~~piezoelectric element~~ representative voltage being detected by the detecting circuit is less than the reference voltage.

Claim 2 (Previously Presented): The digital camera according to claim 1, wherein said energy accumulating unit includes a main capacitor.

Claim 3 (Currently Amended): A digital camera capable of acquiring an image by shifting pixels, comprising:

an imaging device configured to capture a subject image;

a piezoelectric element configured to displace said imaging device;[[,]]

a detecting circuit configured to detect a representative voltage indicative of a level of voltage presently being applied to the piezoelectric element;

a switching unit configured to enable a charging unit configured to charge said piezoelectric element by the energy accumulated in at least one main capacitor configured to supply energy to a strobe unit to provide for strobe unit emission or to enable discharge of said piezoelectric element;

a comparing unit in the charging unit configured to compare a reference voltage corresponding to a predetermined amount of displacement of the imaging device with [[a]] the representative piezoelectric element voltage detected by the detecting circuit and to provide an a charge indicating output indicating that the representative piezoelectric element voltage being detected by the detecting circuit is less than the reference voltage; and

a control unit configured to control said switching unit to enable the charging unit including the comparing unit to enable the charging of said piezoelectric element by the energy accumulated in the at least one main capacitor in response to the charging indicating output of said comparing unit in a first image mode including a state of displacing said imaging device by the piezoelectric element or to control said switching unit to enable the discharge of said piezoelectric element in a second image mode including no displacement of said imaging device by the piezoelectric element.

Claim 4 (Currently Amended): A digital camera capable of acquiring an image by shifting pixels, comprising:

an imaging device configured to acquire a subject image;

a piezoelectric element configured to displace said imaging device;

a detecting circuit configured to detect a representative voltage indicative of a level of voltage presently being applied to the piezoelectric element;

a switching unit configured to enable a charging unit including a charge adjusting circuit to perform a charging operation to charge said piezoelectric element to a specified value of charge voltage by the energy accumulated in at least one main capacitor configured to supply energy to a strobe unit to provide for strobe unit emission or to enable a discharging operation with discharge of any charge voltage on said piezoelectric element; and

a control unit configured to control said switching unit to switch the charging unit including the charge adjusting circuit into a first state to provide the charging operation of said piezoelectric element with image device displacement in a first imaging mode or to switch the charging unit including the charge adjusting circuit into a second state to provide ~~[[a]]~~ the discharging operation to insure no displacement of said piezoelectric element in a second imaging mode,

wherein said charge adjusting circuit includes a comparator portion configured to compare a reference voltage corresponding to a predetermined amount of displacement of the imaging device with ~~[[a]]~~ the representative voltage detected by the detecting circuit ~~piezoelectric element voltage~~ and to provide a first output indicating that the representative ~~piezoelectric element~~ voltage being detected by the detecting circuit is less than the reference voltage or a second output indicating that the ~~piezoelectric element~~ representative voltage being detected by the detecting circuit is equal to or greater than the reference voltage and the charging unit including the charge adjusting circuit provides the charging operation in

response to the first output, stops the-charging operation in response to the second output, and restarts the charging operation when the first output is again provided, and

said control unit is configured to control acquiring a first image during said first imaging mode, and capturing a second image during said second imaging mode of said imaging device.

Claim 5 (Currently Amended): A digital camera capable of acquiring an image by shifting pixels, comprising:

an imaging device configured to capture a subject image;

a piezoelectric element configured to displace said imaging device;

a switching unit configured to charge said piezoelectric element by the energy accumulated in at least one main capacitor configured to supply energy to a strobe unit to provide for strobe unit emission or to discharge said piezoelectric element; and

a control unit configured to control said switching unit to provide a charging operation of said piezoelectric element with image device displacement in a first imaging mode or to provide a discharging operation to insure no displacement of said piezoelectric element in a second imaging mode,

wherein said switching unit includes a charging switch circuit configured to turn on or off charging of said piezoelectric element by the energy accumulated in at least one main capacitor during said charging operation, a discharging switch circuit configured to turn on or off discharging of said piezoelectric element, a detecting circuit configured to detect ~~the~~ a representative voltage indicating a level of voltage presently being applied to ~~on~~ said piezoelectric element, and a comparing circuit configured to make a comparison of the representative voltage ~~on said piezoelectric element~~ detected by said detecting circuit and a reference voltage, said charging switch circuit configured to turn ~~turns~~ on the charging

operation of said piezoelectric element when the comparison indicates that the representative voltage ~~on~~ detected by the detecting circuit ~~said piezoelectric element voltage~~ is less than the reference voltage, and

said control unit is configured to control acquiring a first image during said first imaging mode, and capturing a second image during said second imaging mode of said imaging device.

Claim 6 (Currently Amended): A digital camera capable of taking an image by shifting pixels, comprising:

an imaging device configured to capture a subject image;

a piezoelectric element configured to displace said imaging device;

a switching unit configured to charge said piezoelectric element by ~~the~~ energy accumulated in at least one main capacitor configured to supply energy to a strobe unit to provide ~~for~~ strobe unit emission or to discharge said piezoelectric element; ~~and~~

a detecting circuit configured to detect a representative voltage indicating a level of voltage presently being applied to the piezoelectric element; and

a control unit configured to control said switching unit to provide a charging operation of said piezoelectric element with image device displacement in a first imaging mode or to provide a discharging operation to insure no displacement of said piezoelectric element in a second imaging mode,

wherein said switching unit includes a comparator portion configured to compare a reference voltage corresponding to a predetermined amount of displacement of the imaging device with ~~[[a]] the representative piezoelectric element~~ voltage detected by the detecting circuit and to provide ~~an~~ a charging output indicating that the representative piezoelectric element voltage detected by the detecting circuit is less than the reference voltage and the

switching unit responding to the charging output to charge said piezoelectric element by the energy accumulated in the at least one main capacitor during the charging operation.

Claim 7 (Currently Amended): A digital camera capable of acquiring an image by shifting pixels, comprising:

an imaging device configured to capture a subject image;

a piezoelectric element configured to displace said imaging device;

a switching unit configured to charge said piezoelectric element by the energy accumulated in at least one main capacitor configured to supply energy to a strobe unit to provide for strobe unit emission or to discharge said piezoelectric element;

a control unit configured to control said switching unit to provide a charging operation of said piezoelectric element with image device displacement in a first imaging mode or to provide a discharging operation to insure no displacement of said piezoelectric element in a second imaging mode

a charging switch circuit configured to turn on or off charging of said piezoelectric element by the energy accumulated in the at least one main capacitor during said charging operation;

a discharging switch circuit configured to turn on or off discharging of said piezoelectric element during said discharging operation;

a detecting circuit configured to detect a representative voltage indicative of a voltage level presently being applied to ~~on~~ said piezoelectric element;

a comparing unit configured to make a comparison of the representative voltage ~~on~~ ~~said piezoelectric element~~ detected by said detecting circuit and a reference voltage indicating a displacement of the imaging device,

wherein said charging switch circuit is configured to turn on charging of said piezoelectric element when the comparison indicates that the ~~piezoelectric element~~ representative voltage detected by said detecting circuit is less than the reference voltage during the charging operation[[],] .

Claim 8 (Currently Amended): A digital camera capable of acquiring an image by shifting pixels, comprising:

an imaging device configured to capture a subject image;

a means for displacing ~~piezoelectric element configured to displace~~ said imaging device responsive to a charging voltage;

a means for applying the charging voltage to said means for displacing from ~~switching unit configured to charge said piezoelectric element by the energy accumulated in~~ at least one means for storing energy, said means for storing energy also supplying stored ~~main capacitor configured to supply energy to a strobe unit to provide for providing strobe unit emission or to discharge said piezoelectric element; and~~

a means for discharging the charging voltage from said means for displacing;

a detecting means for detecting a representative voltage indicating a level of voltage presently being applied to the means for displacing;

a means for controlling ~~control unit configured to control said switching unit means~~ for applying the charging voltage to said means for displacing to provide a the charging voltage to ~~charging operation of said piezoelectric element~~ means for displacing for providing ~~with image device displacement in a first imaging mode or to provide a~~ for controlling said means for discharging operation to discharge the charging voltage from said means for displacing to insure no displacement of said piezoelectric element means for displacing in a second imaging mode[[],]; and

~~wherein said switching unit includes a means for comparing comparator configured to~~
~~compare~~ a reference voltage corresponding to a predetermined amount of displacement of the
imaging device with the representative ~~a piezoelectric element~~ voltage detected by the
detecting means and for providing to provide an a first mode output indicating that the
~~piezoelectric element~~ respective voltage is less than the reference voltage and the means for
applying charging voltage to said means for displacing switching unit responding to the first
mode output to ~~charge~~ apply the charging voltage to said means for displacing piezoelectric
element by applying the energy accumulated in the at least one means for storing energy to
said means for displacing ~~main capacitor during the charging operation.~~

Claim 9 (Currently Amended): A digital camera capable of acquiring an image by
shifting pixels, comprising:

an imaging device configured to acquire a subject image;

a piezoelectric element configured to displace said imaging device;

a detecting circuit configured to detect a representative voltage indicative of a level
presently being applied to the piezoelectric element;

a switching unit configured to charge said piezoelectric element by the energy
accumulated in at least one main capacitor also configured to supply energy to a strobe unit
~~for~~ to provide strobe unit emission, and

a control unit configured to control said switching unit to provide a charging
operation to provide image displacement in an imaging mode of said piezoelectric element,

wherein said switching unit includes a charge adjusting circuit including a comparator
portion configured to compare ~~[[a]]~~ the representative voltage on said piezoelectric element
detected by the detecting circuit to a reference voltage value indicating a predetermined
amount of displacement of the imaging device and when the representative voltage ~~on said~~

~~piezoelectric element~~ detected by the detecting circuit becomes lower than the reference voltage value, said adjusting circuit ~~triggers~~ is configured to trigger the switching unit to charge said piezoelectric element in a state of displacing said imaging device.

Claim 10 (Currently Amended): A digital camera capable of acquiring an image by shifting pixels, comprising:

an imaging device configured to acquire a subject image;

a piezoelectric element configured to displace said imaging device;

a switching unit configured to ~~discharge~~ charge said piezoelectric element by the energy accumulated in at least one main capacitor configured to supply energy to a strobe unit ~~for~~ configured to also provide strobe unit emission ~~provided or, the switching unit also~~ being configured to discharge said piezoelectric element;

a control unit configured to control said switching unit to provide a charging operation and to provide a discharging operation of said piezoelectric element,

wherein said switching unit includes a charging switch circuit configured to turn on or off charging of said piezoelectric element, a discharging switch circuit configured to turn on or off discharging of said piezoelectric element, a detecting circuit ~~for detecting the~~ configured to detect representative voltage indicative of a level of voltage on presently being applied to said piezoelectric element, and a comparing circuit configured to compare the representative voltage ~~on said piezoelectric element~~ detected by said detecting circuit and a reference voltage indicating displacement of the piezoelectric element,

wherein said charging switch circuit is configured to turn on charging of said piezoelectric element based on the comparison by said comparing circuit indicating the ~~piezoelectric element~~ respective voltage detected by said detecting circuit is less than the reference voltage, and said control unit is configured to control acquiring a first image in a

state not displacing said imaging device, and acquiring a second image in a state of charging said piezoelectric element so as to displace said imaging device.

Claim 11 (Currently Amended): A digital camera capable of acquiring an image by shifting pixels, comprising:

an imaging device configured to acquire a subject image;

a piezoelectric element configured to displace said imaging device;

a detecting circuit configured to detect a representative voltage indicating a level of voltage presently being applied to the piezoelectric element;

a switching unit configured to charge said piezoelectric element by the energy accumulated in at least one main capacitor configured to supply energy to a strobe unit ~~for~~ to provide strobe unit emission; and

a control unit configured to control said switching unit for controlling a charging and discharging operation of said piezoelectric element,

wherein said switching unit includes a comparing unit configured to compare a the respective voltage on the piezoelectric element detected by said detecting circuit to a reference voltage indicating displacement of the imaging device, the comparing unit being configured to provide an output during the changing operation to control the switching unit to charge said piezoelectric element by the energy accumulate in the main capacitor.

Claim 12 (Currently Amended): A digital camera capable of taking an image by shifting pixels, comprising:

an imaging device configured to capture a subject image;

a piezoelectric element configured to displace said imaging device;

a switching unit configured to charge said piezoelectric element by the energy accumulated in at least one main capacitor configured to supply energy to a strobe unit to provide for strobe unit emission or to discharge said piezoelectric element; and

a control unit configured to control said switching unit to provide a charging operation of said piezoelectric element with image device displacement in a first imaging mode or to provide a discharging operation to insure no displacement of said piezoelectric element in a second imaging mode,

wherein said ~~wherein~~ said switching unit includes a charging switch circuit configured to turn on charging of said piezoelectric element by the energy accumulated in the at least one main capacitor during said charging operation and a detecting circuit configured to detect ~~the~~ a respective voltage on indicative of a level of voltage presently being provided to said piezoelectric element, the switching unit further including a comparing unit configured to make a comparison of the respective voltage on ~~said piezoelectric element~~ detected by said detecting circuit and a reference voltage, said charging switch circuit configured to turn on charging of said piezoelectric element when the comparison indicates that the ~~piezoelectric element~~ respective voltage detected by said detecting circuit is less than the reference voltage during the charging operation.